# United States Patent [19]

**Pelonis**

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[54] **ELECTRIC HEATER EMPLOYING SEMICONDUCTOR HEATING ELEMENTS**


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[52] **U.S. Cl.** ..... **219/370**; 219/368; 219/374; 219/376; 219/382; 219/505; 219/532; 219/541; 338/22 R

[58] **Field of Search** ..... 219/363–368, 219/369–376, 381, 382, 504, 505, 530, 540, 541, 532, 206–207; 338/22 R; 123/549, 557



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[57] **ABSTRACT**

An electric heater employs plate-shaped heating elements, each consisting of a core of semiconductor material whose opposing faces are coated with conductive material and having a multiplicity of apertures to permit passage of air. The heater includes a housing with a rear air inlet and a forward air outlet. A fan having a fan venturi causes air flows forwardly through the housing. A two-piece, ceramic holder maintains a number of the plate-shaped heating elements in generally coplanar, spaced-apart relationship, in front of a forward venturi opening. The holder has a large recess positioned over the forward venturi opening which receives substantially all air flow from the venturi, and a number of passages, one associated with each heating element, which direct air from the recess through the cores towards the forward air outlet. Each of the passages flares radially outwardly and rearwardly from the rear face of the associated heating element, and opens into the recess and the recess flares radially outwardly and rearwardly from about the passage openings to the forward venturi opening. The arrangement results in improved heat transfer and much quieter operation than would otherwise be achieved. To accommodate thermal expansion and contraction of the heating elements, the two pieces of the holder are clamped together by spring-loaded bolts which permit the spacing between the holder members to vary, while still securing the heating elements.


**18 Claims, 5 Drawing Figures**